



- NB : (1) Question No. 1 is compulsory.  
(2) Attempt any four questions out of remaining six questions.  
(3) Assume suitable data.  
(4) Assumption should be clearly stated.  
(5) Use legible handwriting. Use blue/ black ink.

- Q.1. State with reason whether following statements are true or false. (20 Marks)
- (a) When electron is tightly bound then it is likely to take part in Photoelectric reaction.
  - (b) Apparent focal spot is smaller than actual focal spot.
  - (c) Increasing the resonant frequency of ultrasound transducer increases the Lateral resolution.
  - (d) Doppler application requires High Q-factor transducer.
  - (e) Image availability is faster in CR as compared to DR.
- Q.2. (a) Explain the processes of X-Ray generation. (10 Marks)
- (b) Using 100 kVp tube potential what is the minimum wavelength photon (5 Marks) that can be produced.
  - (c) In stationary anode type of X-Ray tube what is the size of apparent focal (5 Marks) spot if size of actual focal spot size is 1.5 mm. Anode angle is  $16.5^\circ$
- Q.3. (a) Explain the Computed Radiography system in detail. (10 Marks)
- (b) Which are the grid performance evolution parameters? Explain them in (10 Marks) detail.
- Q.4. (a) Explain with block diagram Digital Subtraction Angiography system. (10 Marks)
- (b) Explain the construction and working of fluoroscopy machine. (10 Marks)
- Q.5. (a) Explain the pulsed Doppler system. (10 Marks)
- (b) Explain what is quarter wave matching? (5 Marks)
  - (c) What is impedance required for matching layer between PZT (5 Marks) ( $Z=3.0 \times 10^7 \text{ kg/m}^2\text{s}$ ) and water ( $z=1.54 \times 10^6 \text{ kg/m}^2\text{s}$ ) ?
- Q.6. (a) Explain the different type of Endoscopes. (10 Marks)
- (b) Explain with the help of a block diagram the working of Mammography System. (10 Marks)
- Q.7. Write short notes on (Any four) :- (20 Marks)
- (a) Applications of Thermographic Imaging in medicine
  - (b) X-ray film
  - (c) Heel effect
  - (d) X-ray generator
  - (e) B-Mode in Ultrasound.